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PENSOFT

First records of Periscelididae (Diptera, Opomyzoidea) from French Guiana

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Abstract

Periscelididae (Diptera, Opomyzoidea) are recorded for the first time from French Guiana, with 5 species *Marbenia peculiaris* Malloch, 1931, *Neoscutops barcelosiensis* Ale-Rocha & Freitas, 2011, *Neoscutops flavoscutellatus* Ale-Rocha & Freitas, 2011, *Neoscutops peruvianus* Hennig, 1969, and *Planinasus nigritarsus* Mathis & Rung, 2012 found.

Key words

Neotropical Region; new records; Periscelidinae.

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Introduction

Periscelididae are a small cosmopolitan family that is more diverse in the Neotropical Region. Representatives of Periscelididae are associated with sap exuding from deciduous trees (Periscelidinae) or with phytotelmata in the axils of monocotyledons (Stenomicrinae) (Mathis and Rung 2011). Information about the immature stages is very scarce and largely from temperate regions (Williams 1939, Teskey 1976, Papp 1988, 1995, 1998). In the Neotropical Region, information on the biological cycle of *Stenomicra* species associated with *Eryngium* L. (Apiaceae) in Argentina was provided by Campos et al. (2010). Additionally, Gomes et al. (2018) described a *Stenomicra* species from material reared in the axils of *Alocasia macrorrhizos* (L.) G.Don (Araceae) at an urban forest fragment in Brazil.

The family currently comprises about 139 valid species in 10 extant genera and 1 extinct genus (*Procyamops*, known from Baltic amber); 52 species occur in the Neotropical Region, distributed in 9 genera (Mathis and Rung 2011, Mathis et al. 2012, Rung and Ale-Rocha 2011, Freitas and Ale-Rocha 2011, Ale-Rocha and Freitas 2011, Ale-Rocha et al. 2014).

Here we adopt D.K. McAlpine's (1978, 1983) concept of Periscelididae, which includes *Cyamops* Melander, 1913, *Planinasus* Cresson, 1914, and *Stenomicra* Coquillett, 1900, previously allocated to Aulacigastridae. We also adopt the division of the family in 2 subfamilies, Periscelidinae and Stenomicrinae (Grimaldi and Mathis 1993, Baptista and Mathis 1994, Mathis and Papp 1998). Periscelididae flies have broad to slender bodies, body length of 2.5–5 mm, convex and setose face with ventral portion retreated, 1–2 fronto-orbital setae, pedicel cap-like with a dorsal cleft, arista bipectinate, postocellar setae divergent or absent,1 or 2 dorsocentral postsutural setae,vein C lacking true breaks and extended to vein R_{4+5} or vein M, cell dm with a shallow longitudinal fold, vein CuA_2 well developed or not completely closing cell

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Figure 1. Geographic records of *Marbenia peculiaris* Malloch, 1931.

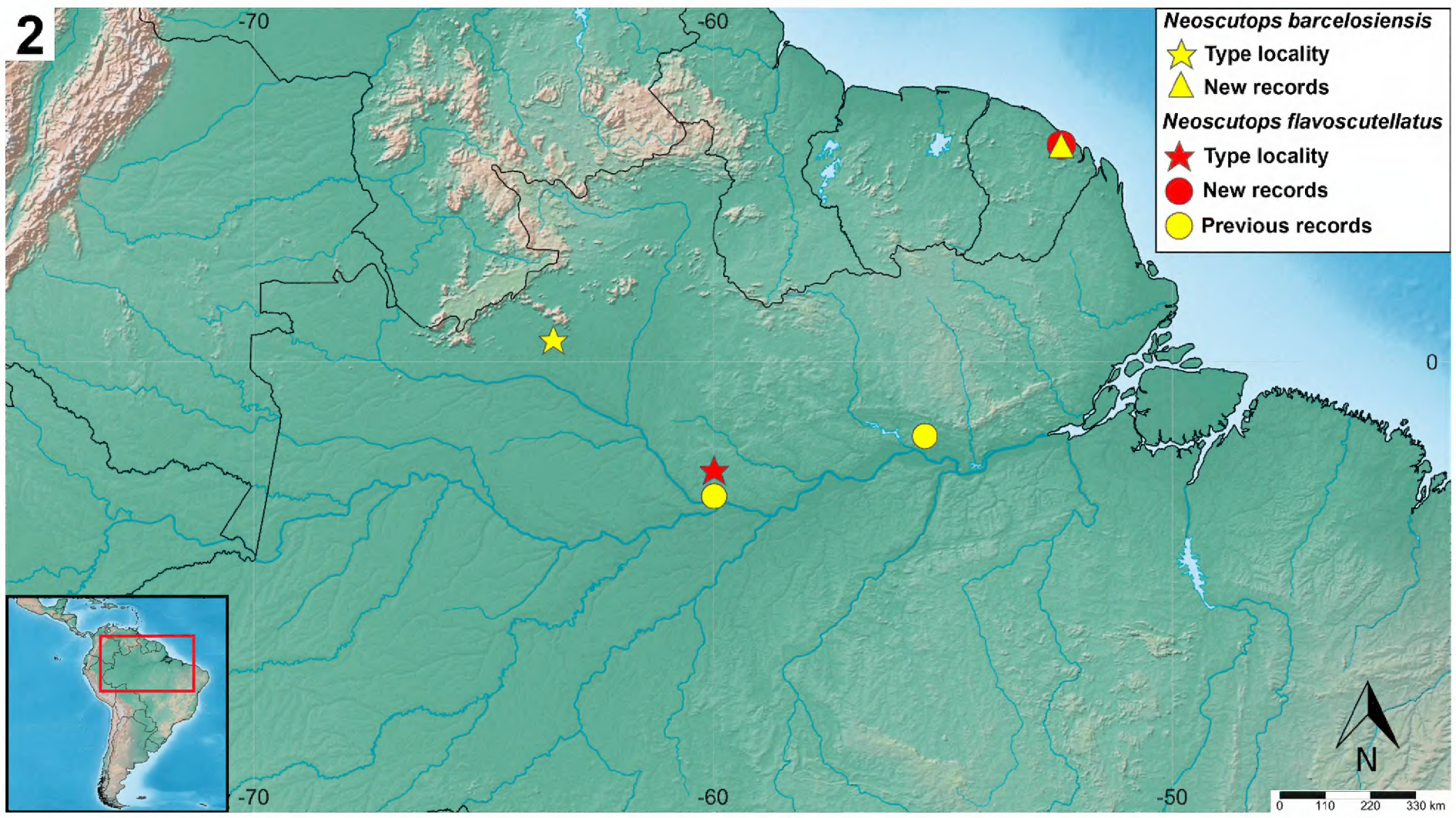


Figure 2. Geographic records of *Neoscutops barcelosiensis* Ale-Rocha & Freitas, 2011 and *Neoscutops flavoscutellatus* Ale-Rocha & Freitas, 2011.

cup, and mid tibia with 1 apicoventral spine-like seta.

Mathis and Rung (2011) compiled a global catalog of the Periscelididae. In the Neotropical Region, Ale-Rocha and Freitas (2011), Mathis et al. (2012) and Ale-Rocha et al. (2014) revised the Neotropical genera *Neoscutops* Malloch, 1926, *Planinasus* Cresson, 1913, and *Marbenia* Malloch, 1931, respectively.

In this contribution we document the first records of Periscelididae for French Guiana. We provide a list of Periscelididae species and their known distribution based on the literature, new records and material examined. We also provide maps with the geographic distribution of each species.

Methods

The material examined belongs to the Natural History Museum (NHMUK), London, United Kingdom. In total 7 specimens were studied. The identification of the mate-

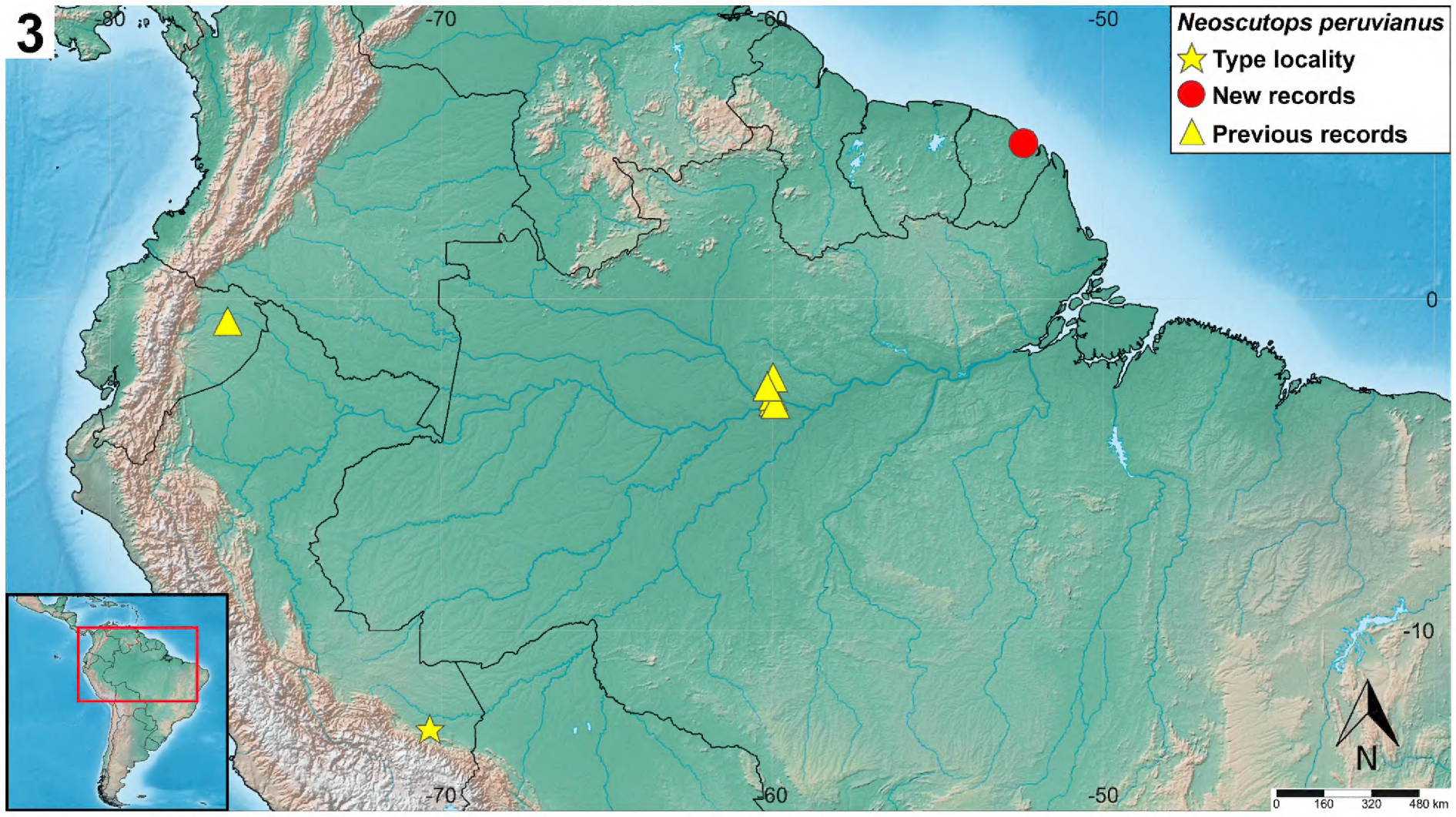


Figure 3. Geographic records of *Neoscutops peruvianus* Hennig, 1969.

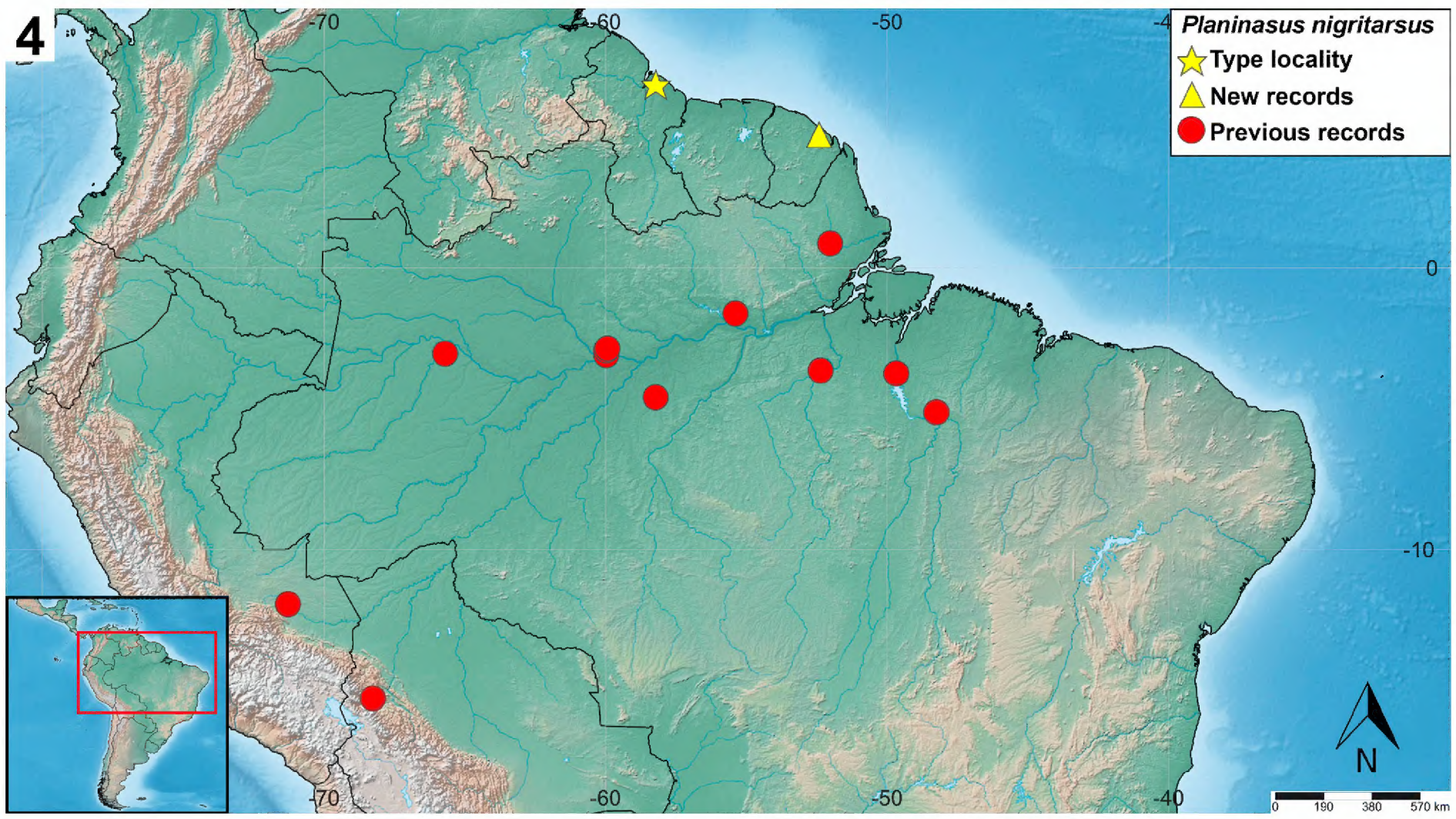


Figure 4. Geographic records of *Planinasus nigritarsus* Mathis & Rung, 2012.

rial was made using the taxonomic keys and descriptions provided by Ale-Rocha and Freitas (2011), Freitas and Ale-Rocha (2011), Mathis et al. (2012) and Ale-Rocha et al. (2014).

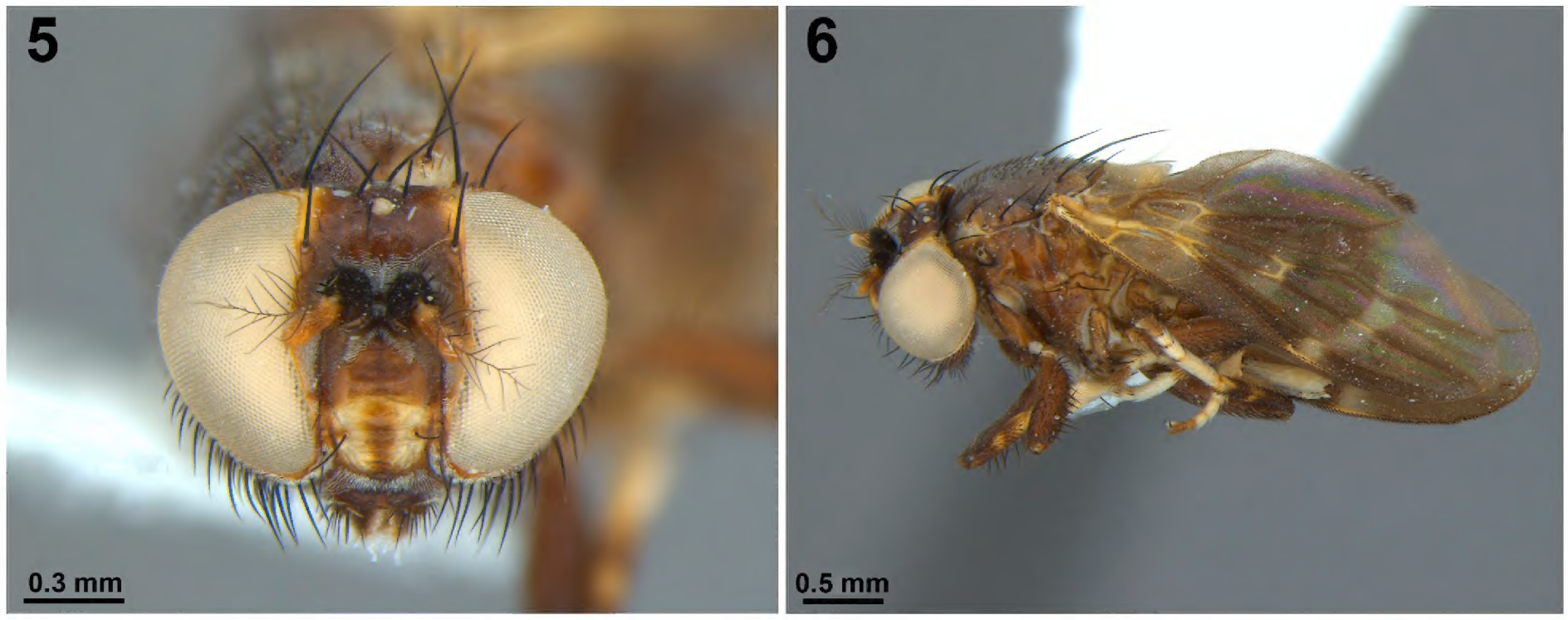
Specimens were photographed with a Leica MC170 HD camera, attached on a Leica M165 C stereomicroscope. Later, photographs were stacked and combined using Leica Application Suite V4.11. Distribution maps were created with Simplemappr (Shorthouse 2010), using coordinates present on the specimen labels and bibliography.

Morphological terminology for adult structures follows those of Cumming and Wood (2009).

Results

Marbenia Malloch, 1931

Diagnosis. Representatives of this genus are character-



Figures 5, 6. *Marbenia peculiaris* Malloch, 1931. **5.** Head, frontal view. **6.** Habitus, lateral.

ized as follows: small flies, body length 2.6–3.5 mm; maxillary palpus short and spatulate; setae of head elongate; postocellar pair well developed; only a pair of setae on facial plate, face with transverse grooves providing a wavy appearance; parafacial, gena, and occiput with numerous strong developed setae; 2 pairs of dorsocentral setae; wing banded; R_1 with dorsal setae; R_{2+3} long and arcuate; M almost straight; bm-cu complete; CuA_2 lacking; A_1+CuA_2 extended close to wing margin.

Comments. *Marbenia* occurs only in the Neotropical Region and currently includes 3 species. The genus was revised by Ale-Rocha et al. (2014) and has been previously recorded from Bolivia, Brazil, Ecuador, and Panama.

Marbenia peculiaris Malloch, 1931

Figs 5, 6

Marbenia peculiaris Malloch 1931: 32, figs 9, 10. Type locality: Porto Bello, Panama. Mathis and Rung 2011: 352 (world catalog); Ale-Rocha et al. 2014 (review).

Diagnosis. *Marbenia peculiaris* (Figs 5, 6) is easily distinguished from all other species of *Marbenia* by the following combination of characters: frons brown or pale brown with lateral margins yellow; face brown on upper half, yellow on lower half with a median yellowish brown stripe, not protruded, and with transverse furrows on medial portion; first flagellomere orange; wing predominantly brown, with basal third yellowish, a small hyaline spot on crossvein r-m and cell R_{2+3}, and a transverse, narrow, and hyaline band on middle distal third; scutum dark brown with postpronotal lobe and postalar callus yellow, covered with silvery gray pruinescence; scutellum yellow.

New country record. French Guiana, Montagne des Chevaux, ix.2009, window trap, 04°43′00″ N, 052°25′00″ W, altitude 90 m, 1 female (NHMUK 0833311).

Geographical distribution (Fig. 1). Bolivia, Brazil (Pará), Ecuador, French Guiana, and Panama (Ale-Rocha et al. 2014).

Neoscutops Malloch, 1926

Diagnosis. Representatives of this genus are characterized as follows: face convex and setose; ocellar setae weak; 1 pair of fronto-orbital reclinate setae; medial and lateral vertical setae well developed; postocellar setae short and divergent; dorsocentral prescutellar seta 1; wing slightly to strongly infuscate, without pale areas; R_1 dorsally setulose; R_{2+3} long, curved toward costal margin, abruptly curved just beyond R_1, and extended very close to Costa; M arched; bm-cu incomplete; CuA_2 incomplete or indistinct; A_1+CuA_2 not reaching wing margin.

Comments. *Neoscutops* is a Neotropical genus comprising 14 species that is known so far only from Brazil, Costa Rica, Ecuador, and Peru. The genus was revised by Ale-Rocha and Freitas (2011).

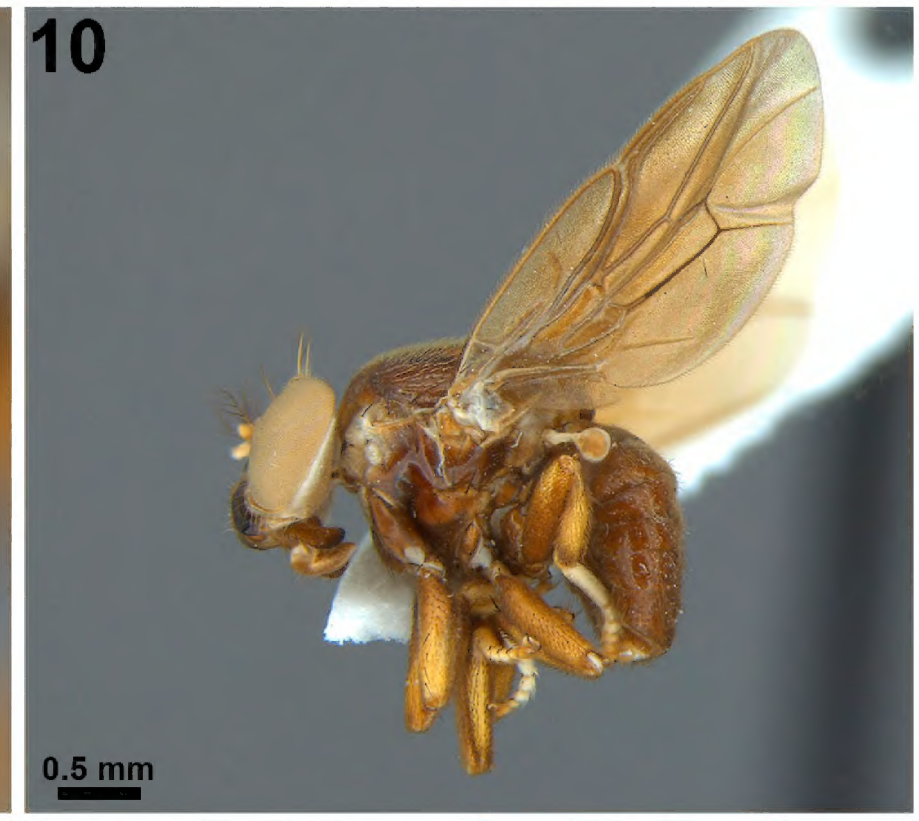
Neoscutops barcelosiensis Ale-Rocha & Freitas, 2011

Figs 7, 8

Neoscutops barcelosiensis Ale-Rocha and Freitas 2011: 6, figs 7–10, 52, 63. Type locality: Barcelos, Amazonas, Brazil.

Diagnosis. *Neoscutops barcelosiensis* (Figs 7, 8) belongs to the *peruvianus* species group, characterized by palpus long and rectangular, M slightly arched, reaching wing margin before wing apex, Rs strongly sclerotized basally, crossvein r-m located beyond middle of upper section of cell dm, and alula with acute apex (Ale-Rocha and Freitas 2011). This species is similar to *N. annulatus* and *N. manuensis* in having a brown to black scutum, but it can be distinguished from them and from the another species of *Neoscutops* by the brown frons with pale brown to yellow lateral margins, face dark yellow with a brown to black central spot on upper portion, pedicel fully brown, scape and pedicel dark brown, first flagellomere yellow, palpus brown, legs brown, mid and hind tibiae with wide median yellow ring and tarsi whitish-yellow with fifth tarsomere slightly darker.

New country record. French Guiana, Montagne des Chevaux, ix.2009, window trap, 04°43′00″ N, 052°25′00″ W, altitude 90 m,1 female (NHMUK 0833304).



Figures 7, 8. *Neoscutops barcelosiensis* Ale-Rocha & Freitas, 2011: (**7**) head, frontal view; (**8**) habitus, lateral. **9, 10.** *Neoscutops flavoscutellatus* Ale-Rocha & Freitas, 2011: (**9**) head, frontal view; (**10**) habitus, lateral. **11, 12.** *Neoscutops peruvianus* Hennig, 1969: (**11**) head, frontal view; (**12**) habitus, lateral.

Geographical distribution (Fig. 2): Brazil (Amazonas) and French Guiana (Ale-Rocha and Freitas 2011).

Neoscutops flavoscutellatus Ale-Rocha & Freitas, 2011

Figs 9, 10

Neoscutops flavoscutellatus Ale-Rocha and Freitas 2011: 8, figs 11–15, 53, 64. Type locality: Manaus, Amazonas, Brazil.

Diagnosis. *Neoscutops flavoscutellatus* (Figs 9, 10) belongs to the *peruvianus* species group (Ale-Rocha and Freitas 2011). This species is similar to *N. manaos* and *N. waorani*, having the face brown with an inverted W-shaped yellow spot, but can be distinguished from both by the yellow clypeus, scutellum and femora. Additionally, *N. flavoscutellatus* differs from other species

Figures 13, 14. *Planinasus nigritarsus* Mathis & Rung, 2012: (**13**) head, frontal view; (**14**) habitus, lateral.

of *Neoscutops* by the color pattern of the face, clypeus and scutellum, as mentioned above, frons pale brown, scape dark brown, pedicel dark brown with whitish-yellow dorsoapical spot, first flagellomere pale yellow, palpus brown, scutum brown with postpronotal lobe and postero-lateral margin slightly paler, legs yellow except basal three fourths of fore tibia brown, base and apex of hind tibiae brown.

New country record. French Guiana, Montagne des Chevaux, x.2009, window trap, 04°43′00″ N, 052°25′00″ W, altitude 90 m, 1 female (NHMUK 0833306), 1 female (NHMUK 0833307); xi.2009, 1 male (NHMUK 0833308), 1 male (NHMUK 0833309).

Geographical distribution (Fig. 2). Brazil (Amazonas) and French Guiana (Ale-Rocha and Freitas 2011).

Neoscutops peruvianus Hennig, 1969

Figs 11, 12

Neoscutops peruvianus Hennig 1969: 603. Type locality: Avispas, Madre de Dios, Peru. Mathis and Rung 2011: 352 (world catalog); Ale-Rocha and Freitas 2011: 15–16 (review).

Diagnosis. *Neoscutops peruvianus* (Figs 11, 12) belongs to the *peruvianus* species-group. Distinguishing this species from *N. luteus* based on external morphology can be tricky in, but *N. peruvianus* can be differentiated by the yellow scape and pedicel and femora without strong posteroventral setae. In *N. luteus* the scape and pedicel are black, and the forefemur bears short strong posteroventral setae. *Neoscutops peruvianus* can be distinguished from congenerics by the yellow frons, brown ocellar triangle, yellow face with dark brown rectangular spot on ventral corners, antenna yellow, palpus long and yellow with apical dark brown spot, clypeus yellow, scutum shiny yellow, scutellum and mediotergite brown, legs yellow except for fore tibia dark brown on apical third and mid tibia pale brown on apical fourth.

New country record. French Guiana, Montagne des Chevaux, ix.2009, window trap, 04°43′00″ N, 052°25′00″ W, altitude 90 m, 1 female (NHMUK 0833305).

Geographical distribution (Fig. 3). Brazil (Amazonas), Ecuador (Orellana), French Guiana, and Peru (Madre de Dios) (Ale-Rocha and Freitas 2011).

Planinasus Cresson, 1914

Diagnosis. *Planinasus* can be distinguished from other genera of Periscelididae as follows: frons with a pair of interfrontal setae, 2 fronto-orbital setae, ocellar setae and postocellar setae absent, basal flagellomere arising from anterior surface of pedicel, costal vein extended to vein M, vein CuA_2 present, cell cup distinct, forefemur with 1–3 posteroventral setae on apical half, scutellum bearing only 1 pair of marginal setae, these apical, tibiae with a dorsoapical seta (Mathis et al. 2012). Species of this genus exhibit considerable sexual dimorphism, especially on the width of the body and coloration of the face.

Comments. *Planinasus* occurs exclusively in the Neotropical Region and currently includes 18 extant and one fossil species. The genus was revised by Mathis et al. (2012) and recoded from Colombia, Belize, Bolivia, Brazil, Costa Rica, Cuba, Dominican Republic, Ecuador, Guatemala, Guyana, Jamaica, Mexico, Panama, Peru, Trinidad and Tobago, and Venezuela.

Planinasus nigritarsus Mathis & Rung, 2012

Figs 13, 14

Planinasus nigritarsus Mathis and Rung 2012: 57, figs 65–69. Type locality: Conservation of Ecological Interactions and Biotic Associations (CEIBA), Guyana.

Diagnosis. *Planinasus nigritarsus* (Figs 13, 14) belongs to the *nigritarsus* species group together with *P. argentifacies* and *P. insulanus*, sharing a mostly yellowish orange antenna with pedicel and basal flagellomere darkened dorsally, a single transverse row of about 8 large facial setae, and fore femur with 1 large posteroventral seta at apical third (Mathis et al. 2012). Additionally, this species can be distinguished from the latter and from the all other species of *Planinasus* by the following combination of characters, in addition to the characters of the *nigritarsus* group: ventral receded portion of face short,

height shorter than the width of antennal pedicel, and with dense silvery white microtomentum; fore coxa frequently whitish yellow; mid- and hind femora brown with basal third to half yellowish; fore tarsus usually blackish, fore basitarsomere slightly compressed (Mathis et al. 2012).

New country record. French Guiana, Montagne des Chevaux, xi.2009, window trap, 04°43′00″ N, 052°25′00″ W, altitude 90 m, 1 female (NHMUK 0833317), male (NHMUK 0833317).

Geographical distribution (Fig. 4). Bolivia (La Paz), Brazil (Amapá, Amazonas, Maranhão, Pará), French Guiana, Guyana, and Peru (Madre de Dios) (Mathis and Rung 2012).

Discussion

French Guiana is a comparatively small country of 84,000 km² in northern South America (Brûlé and Touroult 2014) and is part of the Guiana shield in Northern Amazonia (04°13′ N, 052°59′ W) (Guitet et al. 2015), bordering with Suriname in the west and with Brazil (Amapá State) in the south and east (Guitet et al. 2013). As part of the large Guiana moist forest ecoregion, French Guiana shares a species pool with adjacent countries (Brûlé and Touroult 2014). Due to the lack of real geographical barriers between French Guiana and neighboring countries (Suriname and Brazil), it is believed that the fauna of French Guiana contains few real endemics (Brûlé and Touroult 2014), as observed for its flora (Granville et al. 1996). In addition, previously known insects from French Guiana are also present in the Amazonian part of Andean countries (Granville 1992).

Five species of Periscelididae were recorded for French Guiana in this paper of which only *Marbenia peculiaris* was described from a location outside the Amazon sub-region. The type locality of *M. peculiaris* is located in Panama and this species was also recorded from northern Brazil, Ecuador and Bolivia, in the Amazonian biome (Ale-Rocha et al. 2014). All other species here recorded for the first time from French Guiana have their type localities in northern South America, all within the limits of the Amazonian biome. Thus, their occurrence in French Guiana was expected. Here we record for the first time *N. barcelosiensis* and *N. flavoscutellatus* from beyond their type localities. Described from Peru, *N. peruvianus* has also been recorded in Ecuador and Brazil (Ale-Rocha and Freitas 2011), which suggests its distribution may cover the major part of the Amazon. The same can be suggested for *Planinasus nigritarsus*, which has already been recorded in Bolivia, Peru and northern states of Brazil, all within the Amazon biome (Mathis et al. 2012). Additional collections in neighboring countries may fill the gaps in the distribution of these species and confirm their probable distribution throughout the entire Amazon.

According to Brûlé and Touroult (2014), in their check list of insects of French Guiana, about 15,100 valid species names allocated in 20 orders and 322 families are known in this country and Diptera is one of the poorest studied orders, with only 577 known species. Recently, the fauna of French Guiana has been more intensively studied, greater surveying efforts of the insect fauna have been carried out (Pollet et al. 2014; 2015) and an expressive diversity has been found to other insects (Krolow et al. 2017).

Although this sampling improves our knowledge of Periscelididae, it does not represent the actual diversity of Periscelididae from French Guiana, given the greater diversity of the group in neighboring countries that share the same biome (Ale-Rocha and Freitas 2011, Freitas and Ale-Rocha 2011, Mathis and Rung 2011, Rung and Ale-Rocha 2011, Mathis et al. 2012, Ale-Rocha et al. 2014). Increasing samples from the country will undoubtedly produce a more reliable estimate of the diversity of this family from this part of South America.

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Authors' Contributions

RAR identified specimens. MMMS produced the photographs and map, edited the manuscript. Both authors wrote the manuscript.

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